Amendments to the Claims:

This listing of claims will replace all prior versions and listing of claims in the application:

Listing of Claims:

Claim 1. (Previously Presented): A biofunctionalized quantum dot, comprising:

a nanocrystalline core exhibiting quantum confinement and having a band gap and a surface;

a mercaptoalkanoic acid linked to the surface; and

a biofunctional group linked to the surface,

wherein the biofunctional group comprises a saccharide or the mercaptoalkanoic acid is linked to the surface of the nanocrystalline core without a shell layer.

Claim 2. (Previously Presented): The biofunctionalized quantum dot of claim 1,

the mercaptoalkanoic acid having exactly one carboxyl group and comprising less than seven carbon atoms.

Claim 3. (Previously Presented): The biofunctionalized quantum dot of claim 1,

the mercaptoalkanoic acid comprising mercaptoacetic acid.

Claim 4. (Previously Presented): The biofunctionalized quantum dot of claim 1, further comprising:

a shell layer overcoating the nanocrystalline core.

Claim 5. (Previously Presented): The biofunctionalized quantum dot of claim 4,

the shell layer comprising cadmium sulfide or mercury sulfide; and

the nanocrystalline core comprising cadmium telluride or cadmium selenide or mercury telluride or mercury selenide.

Claim 6. (Previously Presented): The biofunctionalized quantum dot of claim 1,

the saccharide not comprising mannose or dextran.

Claim 7. (Previously Presented): The biofunctionalized quantum dot of claim 1, the saccharide being selected from the group consisting of a tumor-associated antigen and Thomsen-Friedenreich disaccharide.

Claim 8. (Previously Presented): The biofunctionalized quantum dot of claim 1, the saccharide linked to a sulfur atom; and the sulfur atom linked to the surface of the nanocrystalline core.

Claim 9. (Previously Presented): The biofunctionalized quantum dot of claim 1, the saccharide linked to a linking group; the linking group linked to a sulfur atom; and the sulfur atom linked to the surface of the nanocrystalline core.

Claim 10. (Previously Presented): The biofunctionalized quantum dot of claim 9, the linking group comprising a carbon atom.

Claim 11. (Previously Presented): The biofunctionalized quantum dot of claim 1, wherein the biofunctionalized quantum dot is stable in aqueous solution under storage in the dark at 4 °C for at least 4 months with respect to luminescence, precipitation, flocculation, and leaching of the biofunctional group.

Claim 12. (Previously Presented): A formulation comprising the biofunctionalized quantum dot of claim 1 and further comprising a liquid, wherein the biofunctionalized quantum dot is dissolved or suspended in the liquid and wherein the biofunctionalized quantum dot does not precipitate or flocculate.

Claim 13. (Previously Presented): The quantum dot of claim 1, wherein the quantum dot comprises a therapeutic agent.

Claim 14. (Previously Presented): The quantum dot of claim 1, wherein the nanocrystalline core comprises a therapeutic agent or the biofunctionalized quantum dot further comprises a shell layer which comprises a therapeutic agent.

Claim 15. (Previously Presented): A biofunctionalized quantum dot coated device, comprising:

a device adapted for contact with a biological material and

having a device surface; and

biofunctionalized quantum dots according to claim 1,

wherein the biofunctionalized quantum dots are linked to the device surface to form a coating on the device.

Claim 16. (Previously Presented): A cell-quantum dot complex, comprising:

the biofunctionalized quantum dot of claim 1;

and a cell,

wherein the biofunctional group is linked to the cell.

Claim 17. (Previously Presented): A method for producing a biofunctionalized quantum dot, comprising the steps of:

providing a biofunctional group-thiol of Formula III and a mercaptoalkanoic acid; and,

III

refluxing the biofunctional group-thiol of Formula III and the mercaptoalkanoic acid with a cadmium salt, a hydrogen-alkali-group VIA element, and a suitable solvent to produce a quantum dot in a solution,

wherein R_1 comprises a carbon atom ~~and~~,

wherein the group VIA element is selected from the group consisting of tellurium and selenium, and

wherein the biofunctional group comprises a saccharide or the mercaptoalkanoic acid is linked to a surface of a nanocrystalline core of the quantum dot without a shell layer.

Claim 18. (Previously Presented): The method of claim 17,

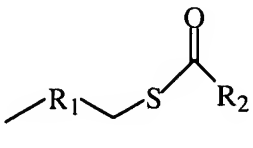
the suitable solvent comprising water or N,N-dimethylformamide.

Claim 19. (Previously Presented): The method of claim 17, further comprising the steps of:

reacting a glycoside of Formula I with an alkylthio acid in the presence of a catalyst to produce a thioester of Formula II;

Acetylated, Benzylidenated Biofunctional Group 

I

Acetylated, Benzylidenated Biofunctional Group 

II

debenzylidenating the thioester of Formula II; and

hydrolyzing the thioester of Formula II to produce the biofunctional group-thiol of Formula III,

wherein R_1 comprises a carbon atom and R_2 comprises a carbon atom.

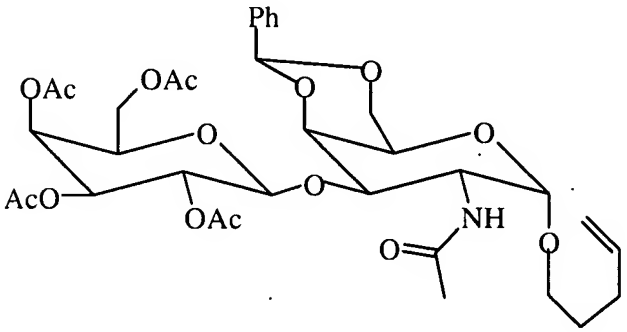
Claim 20. (Canceled)

Claim 21. (Previously Presented): The method of claim 17, wherein the biofunctional group is a

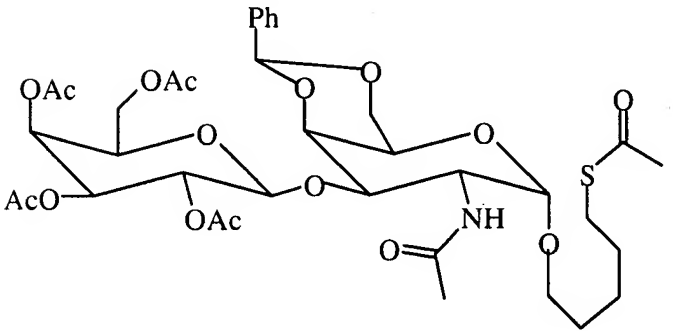
saccharide.

Claim 22. (Previously Presented): A method according to claim 17, further comprising the steps of:

reacting a glycoside of Formula IV with an alkylthio acid in the presence of 2,2'-azobisisobutyronitrile in 1,4-dioxane at about 75 °C to produce a thioester of Formula V;



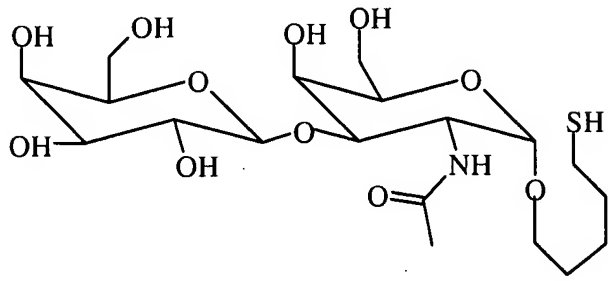
IV



V

debenzylidinating the thioester of Formula V;

hydrolyzing the debenzylidinated thioester of Formula V to produce a Thomsen-Friedenreich-thiol of Formula VI; and



VI

refluxing the Thomsen-Friedenreich-thiol of Formula VI with cadmium perchlorate, mercaptoacetic acid, hydrogen sodium telluride, and a suitable solvent, selected from the group consisting of water and N,N-dimethylformamide, to produce a Thomsen-Friedenreich-functionalized quantum dot in a solution.

Claim 23. (Previously Presented): A method of imaging, comprising the steps of:

providing a biofunctionalized quantum dot according to claim 1;

contacting the biofunctionalized quantum dot with a biological material;

exposing the biological material to light having a wavelength effective to cause the quantum dot to fluoresce; and

imaging the fluorescing quantum dots.

Claim 24. (Previously Presented): The method of claim 23, further comprising the step of using the imaging to identify tissue to which the biofunctional group exhibits high affinity as tissue in a diseased or abnormal state.

Claim 25. (Previously Presented): The method of claim 24, the diseased or abnormal state being cancerous.

Claim 26. (Previously Presented): A method of medical imaging, comprising the steps of:

providing two types of biofunctionalized quantum dots according to claim 1, each type

having a characteristic wavelength distinct from the other types;

each type of quantum dot functionalized with a different antigen or a different set of antigens;

contacting the two types of biofunctionalized quantum dots with a biological material;

exposing the biological material to light having a wavelength effective to cause the quantum dots to fluoresce; and

imaging the fluorescing quantum dots.

Claim 27. (Previously Presented): A method of therapy, comprising the steps of:

providing a biofunctionalized quantum dot according to claim 1; and

contacting the biofunctionalized quantum dot with a biological material and thereby treating a disease.

Claim 28. (Previously Presented): The method of claim 27, further comprising

exposing the biological material to light having a wavelength effective to cause the quantum dot to fluoresce; and

imaging the fluorescing quantum dot.

Claim 29. (Previously Presented): The method of claim 27, wherein the biofunctional group is selected from an immune-response stimulating group, a tumor-associated antigen, a Thomsen-Friedenreich disaccharide, and any combination of these.